

**REMARKS**

This is a full and timely response to the outstanding non-final Office Action mailed April 4, 2005 (Paper No. 033005). Upon entry of this response, claims 46-50 are pending in the application. In this response, claims 46, 48, and 50 have been amended. Applicants respectfully requests that the amendments being filed herewith be entered and request that there be reconsideration of all pending claims.

1. **Rejection of Claims 48 and 49 under 35 U.S.C. §112, Second Paragraph**

Claims 48 and 49 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention. In particular, the Office Action states that:

The process as it pertains to compound (i) is indefinite, because it is unclear how to interpret the language, “reacting a compound (eb) with a compound (fb), or reacting a compound obtained by reacting a compound (eb) with a compound (fb), with a compound (i)...”. Specifically, it is unclear how compound (i) relates to the language, “reacting a compound(eb) with a compound (fb).” Is it proper to read one embodiment of the language as reacting a compound (eb) with a compound (fb) with a compound (i)? If so, then the language is grammatically ambiguous.

(Office Action, p. 2)

Independent claim 48 is amended to further clarify the subject matter which Applicants regard as their invention. Applicants respectfully submit that the amendment overcomes the rejection of claims 48 and 49, and requests that the rejection be withdrawn.

2. **Rejection of Claims 46-50 under 35 U.S.C. §112, Second Paragraph**

Claims 46-50 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention. In particular, the Office Action states that:

Throughout the claims, the language, “having less than two”, renders the claims indefinite, because it cannot be clearly determined if or under what circumstances the language is to encompass or represent zero. Applicants’ argument that “having” mandates a value higher than zero in no way clarifies the issue.

(Office Action, p. 2)

Independent claim 46 is amended to recite “a product(N) which has active hydrogen being reactive with an isocyanate group in one molecule, the number of active hydrogens in one molecule being less than two” and “a silicon compound (product(O)) which has isocyanate groups in one molecule, the number of isocyanate groups in one molecule being less than two.” Applicants respectfully submit that the amended language is clear and unambiguous, specifically, that the product(N) requires the presence of an active hydrogen, and that the product(O) requires the presence of an isocyanate group.

Independent claim 48 is amended to recite “a silicon compound (product(R)) which has an alkoxy group directly bonded to at least one silicon atom and which has secondary amino groups in one molecule, the number of secondary amino groups in one molecule being less than two.” Applicants respectfully submit that the amended language is clear and unambiguous, specifically, that the product(R) requires the presence of a secondary amino group.

Independent claim 50 is amended to recite “a product(V) which has isocyanate groups in one molecule, the number of isocyanate groups in one molecule being less than two.” Applicants respectfully submit that the amended language is clear and unambiguous, specifically, that the product(V) requires the presence of an isocyanate group.

Applicants also note that the instant application has a parent case (Serial No. 09/242,525) currently under prosecution, and that a §112, Second Paragraph rejection of similar language was made in the ‘525 Application (in the Office Action mailed June 28, 2004). The rejection in the ‘525 Application was withdrawn after amendments similar to these were made.

3. Rejection of Claims 46-50 under 35 U.S.C. §112, First Paragraph

Claims 46-50 have been rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Office Action states that “ Applicants have failed to provide enablement for the claimed reactions when the ‘having less than two’ language of the claims is interpreted as meaning zero.” (Office Action, p. 3.) As explained above with reference to the rejection under §112, Second Paragraph, the “less than two” limitation does not include zero. Therefore, Applicants respectfully submit that the rejection under 35 U.S.C. §112, first paragraph is improper, and requests that the rejection be withdrawn.

4. Rejection of Claims 46 and 47 under 35 U.S.C. §103

Claims 46 and 47 have been rejected under §103(a) as allegedly obvious over *Barron* (U.S.4,067,844) or *Zwiener* (U.S. 5,364,955). Applicant respectfully traverses the rejection of claims 46 and 47. It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a combination of references, the cited combination of references must disclose, teach, or suggest, either implicitly, all elements/features/steps of the claim at issue. *See, e.g., In re Dow Chemical*, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); *In re Keller*, 208 U.S.P.Q.2d 871, 881 (C.C.P.A. 1981).

a. Claim 46

The Office Action takes the position that “the respective processes [of *Barron* and *Zwiener*] yield the same product and the only difference amounts to changing the sequence of steps in a multi-step process, and it has been held that such a modification is obvious where an unexpected result is not obtained.” (Office Action, p. 4, section 6.) As will be explained in more detail below, Applicants respectfully disagree with this characterization of the references as

yielding the same product as claims 46 and 47, and also submit that the process of claims 46 and 47 does produce unexpected results.

1) Rejection over Barron

Applicants respectfully submit that the product of *Barron* is different from the product of claim 46, in contrast to the Office Action allegation that “the respective process yields same product.” (Office Action, page 4, lines 6-7.) Specifically, according to the process disclosed in *Barron*, the urethane polymer has a hydrolysable silyl group and a NCO group in the terminal. On the other hand, the product of claim 46 has a hydrolysable silyl group and an OH group in the terminal.

*Barron* also teaches a different ordering of steps compared to claim 46. Specifically, the process disclosed in *Barron* is the ordered steps (1) obtaining an aminosilane, (2) reacting a polyol compound with a polyisocyanate compound to produce a urethane prepolymer, and (3) reacting the amino silane with the urethane prepolymer. (Col. 2, lines 60-66; Col. 3, lines 37-50). Because a prepolymer is produced in step (2) of *Barron*, a side reaction such as demerization and trimerization of urethane prepolymer inevitably occurs, and a product of *Barron* has high molecule and high viscosity. In contrast, the process of claim 46 dispenses with the step of producing a prepolymer, and a product of claim 46 has low viscosity.

Finally, the process of claim 46 allows a urethane resin with a desired modulus to be easily obtained. The process disclosed in *Barron* does not include this feature. Specifically, when a product of *Barron* is moisture-cured, a NCO group and a hydrolysable silyl group could be a bonding site. A hydrolysable silyl group releases an alcohol as a secondary product during cure, and then the secondary product consumes a NCO group. Therefore, the number of possible bonding sites is reduced, contrary to expectations. Further, the reaction speed of hydrolysis of a hydrolysable silyl group and the reaction speed of a NCO group depend on various factors, such

as humidity and temperature. Therefore, it is difficult to anticipate the modulus of a urethane resin produced by the process disclosed in *Barron*.

In contrast, a terminal group of a product of claim 46 is a hydrolysable silyl group or a OH group. Among those groups, a bonding site is a hydrolysable silyl group. Although a hydrolysable silyl group releases an alcohol, it does not affect the modulus of a urethane resin of claim 46 because the product has no NCO group in its terminal. Therefore, a urethane resin with a desired modulus can be easily obtained according to the process of claim 46.

In summary, the process of *Barron* produces a different product than that recited in claim 46. Therefore, Applicants' claimed process is not analogous to changing the sequence of steps in a multi-step process, and a *prima facie* case establishing an obviousness rejection has not been made. Furthermore, even if Applicants' claimed process was analogous to changing a sequence of steps, Applicants' claimed process produces unexpected results. Therefore, a *prima facie* case establishing an obviousness rejection under *Ex parte Rubin* has not been made. For at least these reasons, claim 46 is not obvious over *Barron*, and the rejection should be withdrawn.

## 2) Rejection over *Zwiener*

Applicants respectfully submit that the product of *Zwiener* is different from the product of claim 46, in contrast to the Office Action allegation that "the respective process yields the same product." (Office Action, page 4, lines 6-7). Specifically, according to the process disclosed in *Zwiener*, the urethane polymer has a hydrolysable silyl group in the terminal. On the other hand, the product of claim 46 has a hydrolysable silyl group and an OH group in the terminal.

*Zwiener* also teaches a different ordering of steps compared to claim 46. Specifically, the process disclosed in *Zwiener* is the ordered steps (1) reacting a polyol compound with a polyisocyanate compound to produce a urethane prepolymer, (2) obtaining an aminosilane, and

(3) reacting the amino silane with the urethane prepolymer. (Examples 5 and 8.) Since the process of *Zwiener* includes producing a prepolymer in step (2), a side reaction such as demerization and trimerization of urethane prepolymer inevitably occur, and a product of *Zwiener* has high molecule and high viscosity. On the other hand, the process recited in claim 46 dispenses with the step of producing a prepolymer, and a product of claim 46 has low viscosity.

Finally, the process of claim 46 allows a urethane resin with a desired modulus to be easily obtained. The process disclosed in *Zwiener* does not include this feature. Specifically, according to the process disclosed in *Zwiener*, all the NCO groups react with a silicon compound such as amino-alkyl alkoxyl silanes in advance (in order to avoid the deficiency of *Barron* discussed above). Thus, a secondary product of a hydrolysable silyl group consumes a NCO group.

In general, the modulus of a product is determined by various factors such as molecular weight, molecular structure and the number of bonding sites, with the number of bonding sites typically being the most important. However, the number of possible bonding sites in *Zwiener* depends on the molecular weight and molecule structure of a polyol compound, and it is difficult to obtain a low modulus resin by using low molecular weight polyol compound. Accordingly, a product of *Zwiener* has a narrow range of modulus.

In contrast, in the process of claim 46, one skilled in the art can select a desired silylation degree and the number of bonding site without the limitation of molecular weight and molecule structure of a polyol compound. Therefore, a urethane resin with a desired modulus can be easily obtained according to the process of claim 46.

In summary, the process of *Zwiener* produces a different product than that recited in claim 46. Therefore, Applicants' claimed process is not analogous to changing the sequence of

steps in a multi-step process, and a *prima facie* case establishing an obviousness rejection has not been made. Furthermore, even if Applicants' claimed process was analogous to changing a sequence of steps, Applicants' claimed process produces unexpected results. Therefore, a *prima facie* case establishing an obviousness rejection under *Ex parte Rubin* has not been made. For at least these reasons, claim 46 is not obvious over *Zwiener*, and the rejection should be withdrawn.

b. Claim 47

Since independent claim 46 is allowable, Applicants respectfully submit that claim 47 is allowable for at least the reason that it depends from an allowable claim. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). Therefore, Applicants respectfully request that the rejection of claim 47 be withdrawn.

5. Rejection of Claim 50 under 35 U.S.C. §103

Claim 50 has been rejected under §103(a) as allegedly obvious over *Krafcik* (U.S. 5,614,604). Applicants respectfully traverse this rejection. It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a combination of references, the cited combination of references must disclose, teach, or suggest, either implicitly, all elements/features/steps of the claim at issue. See, e.g., *In re Dow Chemical*, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); *In re Keller*, 208 U.S.P.Q.2d 871, 881 (C.C.P.A. 1981).

The Office Action alleges that *Krafcik* produces the same products as claim 50 and that *Krafcik* teaches that different processes may be employed to produce the same product. From these premises, the Office Action concludes that modifying the sequence of *Krafcik* to arrive at the process of claim 50 is obvious, "since it has been held that changing the sequence of steps in a multi-step process is obvious where an unexpected result is not obtained." (Office Action,

p. 5.) Applicants respectfully disagree with these allegations, and therefore with the conclusion of obviousness.

a. The product of *Krafcik* is different from the product of claim 50

The Office Action alleges that “while the prior art sequence of reaction differs from applicants, the position is taken that the same products are being produced.” (Office Action, p. 4, section 8.) Applicants respectfully disagree with this characterization of the reference, and submit that the product of *Krafcik* is different from the product of claim 50. Specifically, the terminal of the polymer of *Krafcik* is hydrolyzable silyl group, or an alkyl group connected with a urethane linkage, and the hydrolyzed silyl group is hydrolyzed with water. In contrast, the terminal of the product of claim 50 is a hydrolyzable silyl group and an OH group.

Applicants also submit that the product of *Krafcik* is directed to a polyurethane dispersion, while the product of claim 50 is directed to a moisture curable product. Specifically, the process of *Krafcik* comprises the step of charging water, and *Krafcik* discloses “dilute...with...water.” (Col. 6, lines 51-52). Thus, water and a silyl group form a siloxane linkage, and a polyurethane dispersion is obtained. On the other hand, the process recited in claim 50 does not relate to polyurethane dispersion.

b. *Krafcik* neither discloses nor suggests that other processes may be employed to obtain a product of claim 50

The Office Action alleges that “patentee [*Krafcik*] teaches that different processes may be employed to produce the product.” However, Applicants note that *Krafcik* Col. 2, lines 35-36 of *Krafcik* teaches that “the composition” is “the reaction product.” As argued above, the products of *Krafcik* are different than the products of claim 50. Thus, *Krafcik* neither discloses nor suggests that other processes may be employed to obtain a product of claim 50.

c. Other differences between claim 50 and *Krafcik*

*Krafcik* teaches a different ordering of steps compared to claim 50. Specifically, the process disclosed in *Krafcik* is the ordered steps (1) producing an urethane prepolymer, (2) reacting a NCO group of the urethane prepolymer with an alcohol and an aminosilane, and (3) charging water. (Col. 5, line 31 to Col. 6, line 9). Applicants note that *Krafcik* teaches the step of “producing a prepolymer,” and also teaches that “higher molecular weight polymers are produced when the OH:NCO ratio approaches 1:1.” (Col. 5, lines 58-61). Thus, *Krafcik* teaches that a polyol is reacted with a polyisocyanate in the ratio of 1:1 to obtain a prepolymer, and then the prepolymer is dimerized or trimerized to obtain a high molecular prepolymer and high viscosity. In contrast, the process recited in claim 50 dispenses with the step of producing a prepolymer, and a product of claim 50 has low viscosity.

d. Conclusion

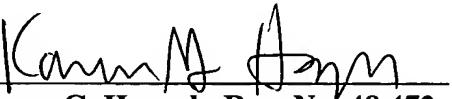
In summary, the process of *Krafcik* produces a different product than that recited in claim 50. Therefore, Applicants’ claimed process is not analogous to changing the sequence of steps in a multi-step process, and a *prima facie* case establishing an obviousness rejection has not been made. Furthermore, even if Applicants’ claimed process was analogous to changing a sequence of steps, Applicants’ claimed process produces unexpected results. Therefore, a *prima facie* case establishing an obviousness rejection under *Ex parte Rubin* has not been made. For at least these reasons, claim 50 is not obvious over *Krafcik*, and the rejection should be withdrawn.

**CONCLUSION**

Applicants respectfully request that all outstanding objections and rejections be withdrawn and that this application and presently pending claims 46-50 be allowed to issue. If the Examiner has any questions or comments regarding Applicants' response, the Examiner is encouraged to telephone Applicants' undersigned counsel.

Respectfully submitted,

**THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.**

By:   
Karen G. Hazzah, Reg. No. 48,472

100 Galleria Parkway, NW  
Suite 1750  
Atlanta, Georgia 30339-5948  
Tel: (770) 933-9500  
Fax: (770) 951-0933